

Appl. No. 09/692,420
Resp. dated May 1, 2006
In Reply to Office Action of Dec. 29, 2005

REMARKS

Claims 1-81 are pending in the present application. The Examiner has rejected claims 1-61 and 75-81 and has allowed claims 62-74.

I. ALLOWED CLAIMS 62-74

Applicants gratefully acknowledge the indication by the Examiner that claims 62-74 have been allowed.

II. REMOVE DEGENHARDT AS A REFERENCE

In the Office Action of May 5, 2005, the Examiner based an obviousness rejection on Degenhardt in view of Sorrells and Gusakov. In the Response of October 5, 2005, Applicants argued successfully that Degenhardt should not serve as the basis of an obviousness rejection. Since the argument was successful as evidenced by the withdrawal of the rejection in the subsequent Office Action, Applicants would not expect Degenhardt to again serve as the basis of an obviousness rejection. Nevertheless, in the Office Action of December 29, 2005, the Examiner has again based an obviousness rejection on Degenhardt (i.e., Degenhardt in view of Hornak).

If the arguments presented in the Response of October 5, 2005 arguing that Degenhardt should not serve as the basis of an obviousness rejection were successful (since the Examiner withdrew that rejection), then how can the Examiner again use Degenhardt as the basis of another obviousness rejection? The arguments of the Response of October 5, 2005 are again applicable here and are incorporated herein in their entirety.

III. IDENTIFY CASCADED FILTERS IN DEGENHARDT

In the Response of October 5, 2005, Applicants respectfully requested that the Examiner identify the "plurality of cascaded filters" in United States Patent No. 5,828,589 ("Degenhardt").

Appl. No. 09/692,420
Resp. dated May 1, 2006
In Reply to Office Action of Dec. 29, 2005

The Examiner failed to address this request and instead used the same general analysis with respect to Degenhardt.

In order to address, with specificity, the rejection raised by the Examiner with respect to Degenhardt, it would be immensely helpful if the Examiner could merely point out the "cascaded filters" in FIG. 1, for example, of Degenhardt that serve as the basis of the rejection.

Applicants respectfully thank the Examiner, in advance, for such a courtesy.

IV. REJECTION OF CLAIMS 1-61 and 75-81 UNDER 35 U.S.C. § 103(a)

Claims 1-61 and 75-81 stand rejected under 35 U.S.C. § 103(a) as being obvious over Degenhardt in view of United States Patent No. 5,6783,222 ("Hornak"). Applicants respectfully traverse the rejection.

Claims 12 and 51 - Programmable Resistor

Claim 12 recites "wherein at least one of the feedback resistors is programmable". Claim 51 recites "wherein at least one of the feedback resistors is programmable". With respect to claims 12 and 51, the Examiner alleges that, of the two cited patent documents, Degenhardt at col. 2, lines 9-44; and col. 7, line 22 to col. 8, line 54 teaches at least these elements. Degenhardt does not even mention a resistor. Degenhardt does not teach this level of detail. Of course, if Degenhardt does not even mention a resistor, Degenhardt certainly does not teach a programmable resistor. Hornak does not mention a programmable resistor either. Degenhardt and Hornak are silent as to a programmable resistor. Thus, the rejection of claims 12 and 51 is respectfully traversed.

Claims 14 and 53 - Programmable Capacitor

Claim 14 recites "wherein at least one of the feedback capacitors is programmable". Claim 53 recites "wherein at least one of the feedback capacitors is programmable". With respect to claims 14 and 53, the Examiner alleges that, of the two cited patent documents,

Appl. No. 09/692,420
Resp. dated May 1, 2006
In Reply to Office Action of Dec. 29, 2005

Degenhardt at col. 2, lines 9-44; and col. 7, line 22 to col. 8, line 54 at least these elements. Degenhardt does not even mention a capacitor. Degenhardt does not teach this level of detail. Of course, if Degenhardt does not even mention a capacitor, then Degenhardt certainly does not teach a programmable capacitor. Hornak does not teach a programmable capacitor. Degenhardt and Hornak are silent as to a programmable capacitor. Thus, the rejection of claims 14 and 53 is respectfully traversed.

Claims 16 and 55 - Cross Coupled Resistor

Claim 16 recites "wherein the cascaded filters each comprises a first cross coupled resistor coupled between an output of the first amplifier and an input of the second amplifier, and a second cross coupled resistor coupled between an output of the second amplifier and an input of the first amplifier". Claim 55 recites "wherein the biquad filters each comprises a first cross coupled resistor coupled between an output of the first amplifier and an input of the second amplifier, and a second cross coupled resistor coupled between an output of the second amplifier and an input of the first amplifier". With respect to claims 55 and 16, the Examiner alleges that, of the two cited patent documents, Degenhardt at col. 2, lines 9-44; and col. 7, line 22 to col. 8, line 54 teaches at least these elements. However, Degenhardt does not even mention a resistor. Degenhardt does not teach this level of detail. If Degenhardt does not teach a resistor, then Degenhardt does not teach a cross coupled resistor between an output of a first amplifier and an input of a second amplifier. If Degenhardt does not teach a resistor, then Degenhardt does not teach a cross coupled resistor between an output of a second amplifier and an input of a first amplifier. Hornak does not teach a cross coupled resistor. Degenhardt and Hornak are silent as to a cross coupled resistor. Thus, the rejection of claims 54 and 12 is respectfully traversed.

Claim 45 - Intertwined

Claim 45 recites "the biquad filters being intertwined with the polyphase filters". With respect to claim 45, the Examiner alleges that, of the two cited patent documents, Degenhardt at col. 2, lines 9-44; and col. 7, line 22 to col. 8, line 54 at least these elements. Applicants

Appl. No. 09/692,420
Resp. dated May 1, 2006
In Reply to Office Action of Dec. 29, 2005

respectfully submit that neither Degenhardt nor Hornak teaches biquad filters *intertwined* with polyphase filters. For at least the above reasons, the rejection with respect to claim 45 is respectfully traversed.

Claim 78

Claim 78 recites "introducing a zero to filter a frequency in the selected channel different from a frequency of the signal". The Examiner alleges that Degenhardt at col. 2, lines 9-44; col. 7, line 22 to col. 8, line 54 teaches at least these elements. In fact, neither the cited text of Degenhardt nor Hornak teaches this level of detail or the introducing of a zero as set forth in claim 78. Thus, the rejection of claim 78 is respectfully traversed.

Claim 79

Claim 79 recites "introducing a plurality of zeros each filtering a different frequency in the selected channel, the filtered frequencies each being different from a frequency of the signal". The Examiner alleges that Degenhardt at col. 2, lines 9-44; col. 7, line 22 to col. 8, line 54 teaches at least these elements. In fact, neither the cited text of Degenhardt nor Hornak teaches this level of detail or the introducing of a zero as set forth in claim 79. Thus, the rejection of claim 79 is respectfully traversed.

Claim 80

Claim 80 recites "wherein the introducing of the zeros comprises programming the number of the zeros introduced". The Examiner alleges that Degenhardt at col. 2, lines 9-44; col. 7, line 22 to col. 8, line 54 teaches at least these elements. In fact, neither the cited text of Degenhardt nor Hornak teaches this level of detail or the programming as set forth in claim 80. Thus, the rejection of claim 80 is respectfully traversed.

Appl. No. 09/692,420
Resp. dated May 1, 2006
In Reply to Office Action of Dec. 29, 2005

Claim 81

Claim 81 recites "programming an order of complex filtering". The Examiner alleges that Degenhardt at col. 2, lines 9-44; col. 7, line 22 to col. 8, line 54 teaches at least these elements. In fact, neither the cited text of Degenhardt nor Hornak teaches this level of detail or the programming as set forth in claim 81. Thus, the rejection of claim 81 is respectfully traversed.

Claims 1-22

Claim 1 recites "a plurality of cascaded filters; and a bypass circuit coupled across one of the cascaded filters".

The Office Action at page 2 states that support for a plurality of cascaded filters can be found at col. 2, lines 9-44; col. 7, line 22-col. 8, line 54 of Degenhardt. Applicants respectfully request that the Examiner specifically point out a plurality of cascaded filters in Degenhardt instead of Applicants hazarding a guess. Reference to a particular component and reference number in a particular figure would be most helpful.

Referring to the cited text in the Degenhardt, it appears that the Examiner may be alleging that adaptive filter 5 and main filter 15 constitute a plurality of cascaded filters. Applicants can only confirm that Degenhardt refers to adaptive filter 5 and main filter 15 as filters. Applicants neither affirm nor deny that adaptive filter 5 and main filter 15 are cascaded filters since such a characterization has no bearing on the arguments as set forth below and the Examiner has yet to confirm that this is his interpretation.

Understanding Degenhardt: Examiner Please Read Carefully

In analyzing the obviousness rejection, Applicants respectfully note that invention taught in Degenhardt is being modified by the inventions taught by Hornak. Thus, the Examiner cannot stray from the underpinning of the obviousness rejection that the Examiner is modifying the self-adaptive trans-hybrid balance filter taught by Degenhardt. See, e.g., the title of Degenhardt. The fundamental structure of the self-adaptive trans-hybrid balance filter is shown in a block circuit

Appl. No. 09/692,420
Resp. dated May 1, 2006
In Reply to Office Action of Dec. 29, 2005

diagram in FIG. 1 of Degenhardt. As can be understood from FIG. 1, the self-adaptive trans-hybrid balance filter includes adaptive filter 5 and main filter 15.

As described in, for example, col. 1, lines 38-51 and 61-67, Degenhardt generally teaches that between two line subscribers (e.g., speakers) A and B, wherein A and B are used here for clarification. Subscribers A and B use local telephones that are connected to telephone service via a local two-wire twisted line connection. Each local two-wire line is connected to a four-wire line of the public switched telephone network. The connection between the two-wire line and the four-wire line is facilitated with a hybrid (i.e., a bridge circuit). Thus, subscriber A is connected to the four-wire line via Hybrid A and subscriber B is connected to the four-wire line via Hybrid B. Due to impedance mismatches between a two-wire line and a four-wire line, echoes (i.e., reflections) are generated at the hybrid. When subscriber A speaks, there is an echo created at Hybrid B which can be quite annoying. When subscriber B speaks, there is an echo created at Hybrid A.

As generally taught in Degenhardt, the self-adaptive trans-hybrid balance filter shown in FIG. 1 attempts to analyze the speech signal of subscriber A on transmission path 7 using adaptive filter 5. The transmission path 7 is a path carrying, for example, the speech signal of subscriber A to subscriber B. The adaptive filter 5 generates filter coefficients based on the speech signal of subscriber A. The filter coefficients are used to generate a signal that estimates the echo (i.e., the echo created at Hybrid B) that will be present on the reception path 14. The reception path 14 is a path carrying, for example, (1) the speech signal of subscriber B to subscriber A and (2) the echo signal based on the speech signal of subscriber A that was reflected at Hybrid B. The main filter 15 generates an estimated echo signal (e.g., the output of main filter 15) that can approximately cancel (e.g., see subtractor 16) the echo signal based on the speech signal of subscriber A that was reflected at Hybrid B and is carried by the reception path 14. Thus, the output of subtractor 16 is ideally just the speech signal of subscriber B without the echo based on the speech signal of subscriber A.

Conclusion

As a courtesy to the Examiner, Applicants have painstakingly explained the self-adaptive trans-hybrid balance filter as illustrated in FIG. 1 of Degenhardt so as to point out that the

Appl. No. 09/692,420
Resp. dated May 1, 2006
In Reply to Office Action of Dec. 29, 2005

Examiner **cannot bypass** the self-adaptive trans-hybrid balance filter or its components such as, for example, adaptive filter 5 and main filter 15.

The Examiner has already admitted that "Degenhardt does not specifically disclose the feature of a bypass circuit coupled across one of the cascaded filters." Office Action at page 2, section 2. Furthermore, Degenhardt refers to the block circuit diagram of FIG. 1 as illustrating "fundamental structure". See, e.g., col. 4, lines 55-47. Fundamental structure implies that all the elements need to be present to practice the Degenhardt invention.

Applicants respectfully submit that the purpose of the self-adaptive trans-hybrid balance filter is to adaptively cancel out echo at subtractor 16.

The Examiner cannot bypass the self-adaptive trans-hybrid balance filter, adaptive filter 5 or main filter 15 without destroying the purpose of Degenhardt which is to adaptively cancel out echo at subtractor 16.

It is at the core of the invention of Degenhardt that adaptive filter 5 and main filter 15 work together to provide the self-adaptive trans-hybrid balance filter.

If the Examiner bypasses the self-adaptive trans-hybrid balance filter then there is no echo cancellation and Degenhardt has been completely gutted of its teachings.

If the Examiner bypasses main filter 15, then the self-adaptive trans-hybrid balance filter cannot generate an estimated echo cancellation signal. Without the estimated echo cancellation signal, there can be no echo signal cancellation at subtractor 16.

If the Examiner bypasses adaptive filter 5, then there can be no adapting filter coefficients based on the speech signal of subscriber A. Without adaptive filter coefficients, Degenhardt can no longer principally function as a "self-adaptive" trans-hybrid balance filter. Furthermore, since the adaptive filter coefficients are used to accurately generate an echo cancellation signal, the self-adaptive trans-hybrid balance filter would no longer be effective in canceling echo (e.g., the echo of speech signals of subscriber A which were reflected at Hybrid B) carried by the reception path 14.

Modifying Degenhardt as suggested by the Examiner would change the core principle of operation of Degenhardt which is prohibited by M.P.E.P. § 2143.01 ("the proposed modification cannot change the principle of operation of a reference").

Appl. No. 09/692,420
Resp. dated May 1, 2006
In Reply to Office Action of Dec. 29, 2005

Furthermore, modifying Degenhardt as suggested by the Examiner would render Degenhardt unsatisfactory for its intended purpose which is also prohibited by M.P.E.P. § 2143.01 ("the proposed modification cannot render the prior art unsatisfactory for its intended purpose").

For at least the above reasons, Applicants respectfully submit that the obviousness rejection cannot be maintained based on the modification of Degenhardt as alleged by the Examiner.

It is therefore respectfully requested that the obviousness rejection be withdrawn with respect to claim 1 and its dependent claims (i.e., claims 2-22).

Claims 23-43

Claim 23 recites "a plurality of cascaded filters; and bypass means for bypassing at least one of the cascaded filters".

The same or similar arguments, if appropriate, made with respect to claim 1 are also made herein with respect to claim 23.

For at least the above reasons, Applicants respectfully submit that the obviousness rejection cannot be maintained based on the modification of Degenhardt as alleged by the Examiner.

It is therefore respectfully requested that the obviousness rejection be withdrawn with respect to claim 23 and its dependent claims (i.e., claims 24-43).

Claims 44-61

Claim 44 recites a polyphase filter coupled to a biquad filter.

Applicants respectfully submit that, in support of the obviousness rejection, the Examiner has cited two patent documents to show a polyphase filter coupled to a biquad filter. Applicants respectfully submit that the two patent documents do not teach at least a polyphase filter and, in particular, a polyphase filter coupled to a biquad filter.

Appl. No. 09/692,420
Resp. dated May 1, 2006
In Reply to Office Action of Dec. 29, 2005

In support of the rejection, the Examiner alleges that these elements are met by the combination of:

- (1) Degenhardt at FIGS. 1-2; col. 2, lines 9-44; and col. 7, line 22 to col. 8, line 54; and
- (2) Hornak at col. 6, lines 22-51; col. 9, lines 16-50; col. 18, lines 45 to col. 19, line 65.

Applicants respectfully disagree. Applicants have carefully perused the drawings and text cited by the Examiner and can find no reference to a polyphase filter or to a polyphase filter coupled to a biquad filter.

In fact, neither Degenhardt nor Hornak even mentions a polyphase filter. Applicants respectfully submit that Degenhardt and Gusakov, individually or combined, do not teach a polyphase filter and, in particular, a polyphase filter coupled to a biquad filter. Since the combined references do not even mention a polyphase filter, Applicants respectfully submit that the rejection cannot be maintained. It is therefore respectfully requested that the rejection be withdrawn with respect to claim 44 and its dependent claims (i.e., claims 45-61).

If the Examiner intends to maintain the rejection of claims 44-61 over Degenhardt in view of Sorrells and further in view of Gusakov, then it should be a simple matter of pointing out a polyphase filter in FIG. 1 or FIG. 2 of Degenhardt or a polyphase filter in Hornak that is specifically taught to be a polyphase filter or is specifically taught to be a polyphase filter coupled to a biquad filter.

After the Examiner has identified which of the above-identified filters is a polyphase filter and after the Examiner has provided supported from the cited patent documents, Applicants respectfully request that the Examiner demonstrate how they are coupled.

Applicants have carefully reviewed the figures and text cited by the Examiner and respectfully submit that neither Degenhardt nor Hornak describes or teaches a polyphase filter coupled to a biquad filter.

It is therefore respectfully requested that the rejection be withdrawn with respect to claim 44 and its dependent claims 45-61.

Appl. No. 09/692,420
Resp. dated May 1, 2006
In Reply to Office Action of Dec. 29, 2005

Claims 75-81

The same or similar arguments made with respect to claim 1, if appropriate, are also made herein with respect to claim 23.

For at least the above reasons, Applicants respectfully submit that the obviousness rejection cannot be maintained based on the modification of Degenhardt as alleged by the Examiner.

It is therefore respectfully requested that the obviousness rejection be withdrawn with respect to claim 75 and its dependent claims (i.e., claims 76-81).

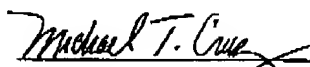
V. CONCLUSION

In view of at least the foregoing, it is respectfully submitted that the pending claims 1-81 are in condition for allowance. Should anything remain in order to place the present application in condition for allowance, the Examiner is kindly invited to contact the undersigned at the below-listed telephone number.

The Commissioner is hereby authorized to charge additional fees or credit overpayments to the deposit account of McAndrews, Held & Malloy, Account No. 13-0017.

Dated: May 1, 2006

Respectfully submitted,



Michael T. Cruz
Reg. No. 44,636

McAndrews, Held & Malloy, Ltd.
500 West Madison Street, 34th Floor
Chicago, Illinois 60661
Telephone: (312) 775-8084
Facsimile: (312) 775-8100